

forecast, although forecasts of much colder weather were sent to such points as could be reached. Reports from Carson City were not received on January 28.

The general rains for both northern and southern California were forecast, and no adverse comment has been made upon the work of the service. Some complimentary letters have been received.

The frosts in southern California on the morning of January 30 were accurately forecast.—A. G. McAdie, Professor.

PORTLAND, OREG., FORECAST DISTRICT.

The first half of the month was mild and dry, but on the 19th a stormy period began which lasted almost uninterruptedly during the remainder of the month. There were no cold waves during the month.

Timely warnings were issued for all storms, and no important casualties, due to stress of weather, occurred. The Norwegian bark, *Prince Arthur*, was wrecked January 2, on the northwest Washington coast, with a loss of 18 lives. It is supposed that the captain made a mistake in his reckoning as the ship was steered into the breakers during the night.

Unusually high winds prevailed at times along the Washington coast. At North Head, a maximum wind velocity of 76 miles from the southeast occurred on the 29th, and 64 miles an hour from the southwest was reported on the 23d from Tatoosh Island.

The warm rains during the middle of the month caused streams in western Oregon to overflow their banks, and flood warnings were issued between the 22d and the 31st. These warnings were accurate and of great value to the people living near the submerged districts, as well as to mill men and those interested in river navigation.—E. A. Beals, Forecast Official.

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocity.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.....	6, a. m.	48	123	9, p. m.	27	80	3,050	3.5	871	36.3
II.....	8, p. m.	53	108	11, a. m.	32	65	2,900	2.5	1,160	48.3
III.....	11, a. m.	53	108	14, p. m.	32	81	2,550	3.5	729	30.4
IV.....	13, p. m.	44	116	16, a. m.	35	85	2,100	2.5	840	35.0
V.....	16, p. m.	53	108	20, p. m.	46	60	2,700	4.0	675	28.1
VI.....	21, a. m.	32	106	22, p. m.	28	83	1,550	1.5	1,033	43.0
VII.....	21, p. m.	53	108	25, a. m.	48	88	2,100	3.5	600	25.0
VIII.....	28, p. m.	38	122	1, a. m.*	32	65	3,500	3.5	1,000	41.7
Sums.....							20,450	24.5	6,908	287.8
Mean of 8 paths.....							2,556		864	36.0
Mean of 24.5 days.....									835	34.8
Low areas.										
I.....	1, a. m.	29	95	4, a. m.	46	60	2,300	3.0	767	32.0
II.....	2, p. m.	51	120	5, p. m.	30	82	2,400	3.0	800	33.3
III.....	5, a. m.	54	114	7, a. m.	46	60	3,450	4.5	767	32.0
IV.....	9, a. m.	35	112	9, a. m.	48	54	3,150	4.0	788	32.8
V.....	16, a. m.	48	89	12, a. m.	47	65	3,000	3.0	1,000	41.7
VI.....	18, p. m.	51	114	18, a. m.	47	65	1,225	2.0	612	25.5
VII.....	20, p. m.	51	120	22, a. m.	46	60	2,925	3.5	836	34.8
VIII.....	20, p. m.	51	120	24, a. m.	48	54	1,800	1.5	1,200	50.0
IX.....	21, p. m.	51	120	24, a. m.	38	85	3,300	3.5	943	39.3
X.....	24, a. m.	48	124	26, p. m.	46	87	2,350	2.5	940	39.2
	27, a. m.	39	120	30, p. m.	48	68	1,975	2.5	790	32.9
							2,900	3.5	828	34.5
Sums.....							30,775	36.5	10,271	428.0
Mean of 12 paths.....							2,565		856	35.7
Mean of 36.5 days.....									843	35.1

* February.

For graphic presentation of the movements of these highs and lows see Charts I and II.—Geo. E. Hunt, Chief Clerk, Forecast Division.

RIVERS AND FLOODS.

There was some slight southern extension of the ice limit during January, but not so great as during the corresponding period of 1902. There was also a considerable increase in the thickness of the ice in the rivers of the northern districts, Moorhead, Minn., reporting 32 inches, as compared with 18 inches at the close of the preceding month.

Nothing of special interest was noted except in the rivers of South Carolina and the north Pacific district. In the former State the rivers were above the normal winter stages during the entire month, and warnings were issued on the 4th for danger-line stages in the Wateree, Pedee, and Congaree rivers. The stages reached in the two former rivers were from 2 to 3 feet above the danger lines, but no damage was reported.

The following report of the flood in the Willamette River of Oregon was prepared by Mr. E. A. Beals, Official in Charge of the Weather Bureau office at Portland, Oreg.:

Up to the 18th the weather in Oregon during January, 1903, was not especially noteworthy, but on that date a rainy spell, accompanied by warm weather, set in, which lasted a full week. The rainfall was very heavy up to the 25th, after which date the weather turned colder and most of the precipitation occurring later was in the form of snow.

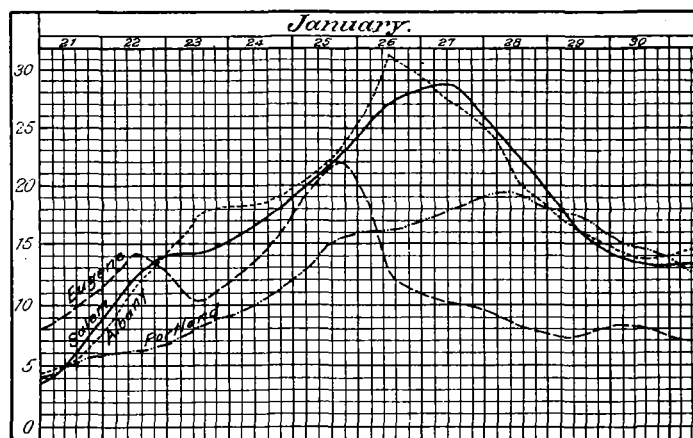
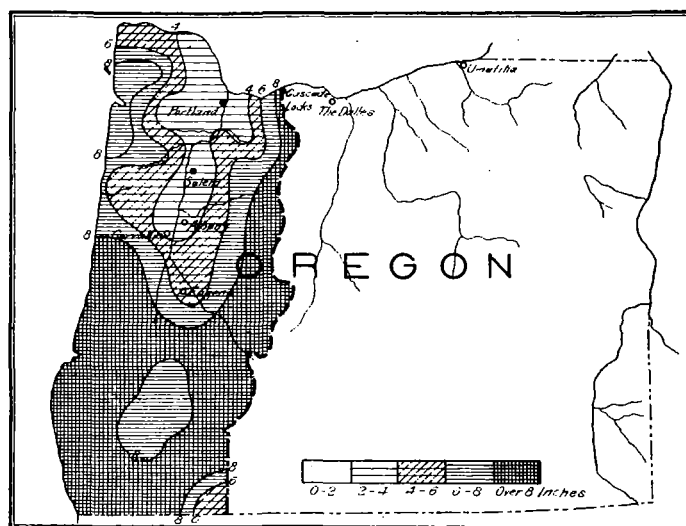


FIG. 1.—Precipitation in western Oregon from January 17 to 25, 1903, inclusive.

The rains were heaviest in the southern half of western Oregon, and on the 24th a number of stations in this section reported amounts as high as 3 inches or more, while for the period between January 17 to 24, inclusive, the rainfall ranged from 8.62 inches at Drain, to 14.29 inches at Buckhorn Farm, near Kerby. In the lower portion of the Willamette Valley the rainfall was considerably lighter, being generally between 3 and 4 inches.

The streams in western Oregon began to rise rapidly on the 21st and the evening weather report contained the following announcement:

“Heavy rains have fallen in southern Oregon, and the river at Eugene

is rising rapidly. Should there be any danger of a freshet in the lower Willamette River special reports will be obtained Thursday and the public notified."

The river rose rapidly during the next few days and finally reached a stage of 22.0 feet at Eugene, on the 25th; 31.5 feet at Albany, on the 26th; 29.0 feet at Salem, on the 27th, and 19.3 feet at Portland, on the 28th. Accurate and timely warnings were sent to up river points on the 24th and 25th, and the public in Portland were equally as well informed of the stages about to occur in the lower end of the valley.

The chart of rainfall and the hydrographs below it, fig. 1, show graphically the cause of the flood together with the stages reached at the river stations reporting to this center.

The flood caused widespread damage of the usual character though very fortunately no lives were lost. Railroad beds were washed out; bridges, houses, barns, and outbuildings were carried away; millions of feet of logs were torn from their

moorings and carried down the river; farm lands were overflowed, and much live stock and other portable property destroyed. The damage, however, could not have been prevented, and was limited to property that could neither be removed nor protected when the warnings were issued.

The highest and lowest water, mean stage, and monthly range at 162 river stations are given in Table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Forecast Official.*

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following summaries relating to the general weather and crop conditions during January are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau, and are based upon voluntary reports from meteorological observers and crop correspondents, of whom there are about 3000 and 14,000, respectively:

Alabama.—Precipitation deficient, but rains so frequent as to retard all farm work. Oats slightly damaged by cold during middle of month. Last week warm enough to cause fruit buds to swell. Oats and wheat promising. Some corn and cotton land being prepared, and preparations for early trucking crops getting under way during last decade.—*F. P. Chaffee.*

Arkansas.—The weather was generally unfavorable for plowing and preparing the ground for the coming season's crop, and very little work of this nature was done. Considerable late matured cotton remained in the fields at the month, but on account of the weather conditions and the nearness of the time to prepare the ground for the next season's crop, much of this will remain ungathered. Winter wheat and oats appeared to be in good condition. Fruit trees were apparently uninjured.—*Edward B. Richards.*

Arizona.—Cold weather prevailed during part of the month, and the temperature was generally above the normal. There was a decided deficiency of precipitation, and at many stations there was none whatever. The cold weather caused some damage to growing crops, and plowing was delayed somewhat by frozen ground. As a rule, however, agricultural prospects in this territory were excellent. In many localities they were reported to be the best for years. The ranges were in good condition and grain was doing well.—*M. E. Blystone.*

California.—Cold, cloudy, and foggy weather continued until about the 20th, greatly retarding the growth of all vegetation. A few days of warm weather, accompanied by heavy rain, toward the close of the month caused a rapid growth of grain and grass and greatly benefited orchards. The heavy rain in northern California caused a rapid rise of creeks and rivers, damaging grain and other property to some extent.—*Alexander G. McAdie.*

Colorado.—In the mountain districts, in common with the plains region, dry weather characterized the first and second decades of January. The last decade, however, was stormy, while the precipitation was generally greater than for January, 1902, yet in only a few localities on the different watersheds was the total brought near the normal. The snow is packed hard in huge drifts in the gulches and timber, where it has been swept by the prevailing high winds; the outlook was favorable to a steady flow of water.—*F. H. Brandenburg.*

Florida.—The month was favorable for vegetables, except on some low lands, where the soil was too wet. Cabbages, Irish potatoes, tomatoes, and other vegetables were available in goodly amounts. Celery made poor progress, owing to unseasonably warm weather. The coldest weather occurred during the first decade, when freezing conditions prevailed to the lower portion of the central district. Citrus trees were well advanced, some showed bloom. Peach trees, generally, were in bloom. Some corn was planted during the last decade.—*A. J. Mitchell.*

Georgia.—The temperature for the month was below the average, but the weather was not at any time severe. The 13th was generally the coldest day. The 29th was very warm for the season. The rainfall was below the normal in the northern and middle sections and slightly above in the southern. The month was characterized by a preponderance of cloudy and rainy days. Winter wheat and oats passed through the month favorably. Stock was reported in good condition. Plowing was well advanced for the season in some of the central counties. The outlook for fruit at the close of the month was propitious.—*J. B. Marbury.*

Idaho.—Fair weather, with moderately low temperature, prevailed from the 5th to 16th. From the 17th to close of the month daily pre-

cipitation occurred in nearly all parts of the State. Heavy snow fell on all the mountains and in high plateau sections, consequently the accumulated snow at the close of January was the greatest for at least the past five years. Winter stock ranges were covered with snow to an unusual depth, necessitating more general feeding of stock than for many years. Fall sown wheat had a good snow protection.—*S. M. Blandford.*

Illinois.—The weather was remarkably mild, except a brief cold spell from the 8th to the 13th. The average temperature was slightly above normal. Precipitation was deficient but well distributed. The average condition of wheat was good; some injury to the crop ensued in the southern district from alternate freezing and thawing. The rye crop was thriving. Conditions were favorable for meadows and grasses. Fruit trees remained uninjured.—*W. G. Burns.*

Indiana.—Wheat was well protected by snow during the greater part of January and when, near the last of the month the ground became bare, the crop, with few exceptions, was found to be in excellent condition. The exceptions were fields that had been planted prior to September 25 and damaged by flies before winter began. The weather and condition of the ground were not favorable for field work, and considerable corn remained unharvested at the close of the month. Live stock of all kinds was wintering in good condition.—*W. T. Blythe.*

Iowa.—The month was unusually favorable for stock feeding and for gathering the unharvested portion of the corn crop. Fall wheat and rye, of which a very small acreage was sown, was not materially damaged by freezing weather.—*John R. Sage.*

Kansas.—The mild weather was favorable to outdoor work and corn husking progressed rapidly; some plowing was done in the south the latter part of the month. Wheat looked well but needs moisture.—*T. B. Jennings.*

Kentucky.—The condition of wheat was generally encouraging at the end of the month. In the western portion of the State some fields in low, wet land seemed to have been injured somewhat by freezing and thawing, but in the central and eastern portions it looked very promising. Very little work was done in preparing tobacco beds. Farm stock was in good condition and feed was fairly plentiful. Fruit trees appeared to be doing well.—*H. B. Hersey.*

Louisiana.—Unfavorable weather for agricultural interests prevailed during the greater part of the month. Frequent showers kept the ground too wet for tillage, and preparation for planting spring crops progressed slowly. There was too much rain for sugar cane, and it was feared that a continuation of wet weather will injure seed cane. Preparations for rice seeding were pushed as rapidly as possible. Winter truck gardens have made splendid growth. The weather was favorable for oranges.—*I. M. Cline.*

Maryland and Delaware.—Temperature normal; precipitation abundant and fairly well distributed. Winter growth received ample and protective snow covering in the northern and western counties, but in the south and east the ground was bare most of the month. Wheat was in fine condition in the first-named area; elsewhere early sown was fair, barring local injury by fly; late sown wheat was injured somewhat by frequent freezing and thawing. Grasses were in good condition. Ground was generally too wet for farm work.—*Oliver L. Fassig.*

Michigan.—The weather conditions during January were favorable for winter wheat and rye: the ground was well protected with snow until the 27th, when it was partly uncovered by rains in portions of the central and southern sections. There was very little alternate freezing and thawing, and correspondents, as a rule, reported little or no damage of any kind. The wheat plant was rather small on account of the late seeding last fall, but appeared green and healthy. On account of ample snow protection during the most severe weather there was very little frost in the ground.—*C. F. Schneider.*

Minnesota.—The maximum temperatures occurred for the most part on the 6th and 26th, and the minimums on the 11th and 30th. The minimum temperatures were not at all low for January. Snow covered the